

SRIJAN

INTELLIGENT EXPRESSIONS

CES Highlights Inside

The Future of AI

Smart Home Devices

Virtual Reality

Chatbots and Drones

5G Footprints

VOLUME 8



DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF DELHI

ABOUT SRIJAN

Srijan means creation. Srijan is the annual magazine of Department of Computer Science, University of Delhi. It is launched every year at Sankalan.

Srijan started with an aim to capture the tremendous advancements in technology and lay out a bigger picture in a few words. Since then, we have been trying to capture and highlight what happened in the past year and what lies ahead. Srijan aims at giving a complete roundup of the emerging tech within the field of computer science.

Magazine also includes some ART, as we believe programming is an ART. And one who can program is an Artist at heart.

The theme for this year's srijan is CES 2018 CES is huge, and it matters. CES or the Consumer Electronics Show is the most significant annual trade show across the globe. It is organized by the Consumer Technology Association in Las Vegas. CES usually have about twice the number of attendees than Mobile World Congress. CES has evolved to show us that what seems awkward and "for rich, lazy people" one year, becomes reasonable, practical, and available to everyone seemingly overnight. CES is all about showing us how everyday life will get better next year or the year later. CES encompasses and touches the concepts of upcoming technologies which ultimately ends in the homes of the bourgeoisie. A few major topics which covered in CES 2018 include Smart Home Devices: Alexa, Google Home & other voice assistants. Convertible Laptops, Companion Robots, Virtual Reality, 5G Technology, Health Sensors, and many more.

From the HEAD'S Desk



The excitement in the arena of IT touches youngsters much faster than the seniors and experienced. The current hot favourite is Artificial Intelligence, lovingly called AI.

This issue of Srijan covers applications of AI spanning from health care to automatic delivery of articles by drones, chatbots to Sophia and smart homes. Innovative uses of AI aim to improve the quality of human existence in various walks of life.

Today AI seems to pervade humanity to such an extent that its creators are now wary of the creation. Stalwarts like Stephan Hawking and Elon Musk have raised serious concerns about the potential risk of AI to human civilization. Responsible use of AI is the “awakening” call that no computer scientist can afford to ignore.

Kudos to the authors and the editorial team for compiling this issue. I sincerely hope that in future also Srijan will cover contemporary topics for its readers.

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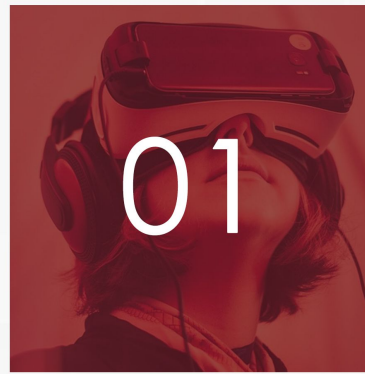
The Editorial Team of Srijan takes immense pleasure to present the eighth edition of our Annual Tech Magazine 'SRIJAN'. Listing all the technological advancements is itself a task in this ever-evolving world of technologies. This year we tried to capture the Consumer Electronics Show. CES is one stop platform to capture all the new developments in the field of technology. From a pool of topics, we tried to cover some of the exciting ones. Artificial intelligence, 5G Technology, Smart home devices, Virtual Reality, Drones, Neuromorphic Computing, and more. Essentially, you get all the new advancements in the form of curated articles at one place. Apart from the technology, you'll find glimpses of the thoughts of this generation on the recent technological advancements happening across the globe.

Turn the page over to start the adventure. We hope you like it

- The SRIJAN Team

CONTENTS

- 01 Virtual Reality
- 02 Chatbots
- 04 Smart Home devices
- 06 Neuromorphic Computing
- 08 Health Sensors
- 10 Sophia - A Beautiful AI
- 12 Drones
- 14 Expressions
- 16 Watch Them Roll
- 18 Artificial Intelligence - Aid to Health Care
- 20 The Future of AI
- 22 Heard of Docker
- 24 Time Travel
- 26 Technocratic Entrepreneurialism
- 28 5G Footprint
- 29 *Mai Alfaaz Likhunga*
- 30 Life @DUCS
- 32 Acknowledgements



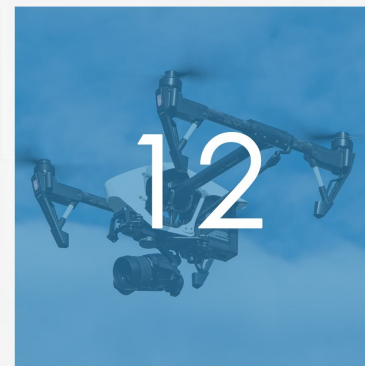
Virtual Reality

"VR is a way to escape the real world into something more fantastic."
-Palmer Luckey



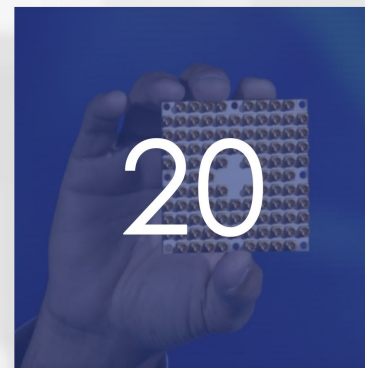
Smart Home Devices

Alexa,
Open Smart Home Devices.



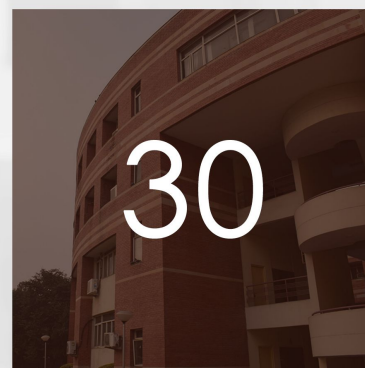
Drones

"It is a drone nation where everything and everyone is remotely controlled."
- Bryant McGill



The Future of AI

"A year spent in AI is enough to make one believe in God."
- Alan Perlis



Life @DUCS

"Some memories are unforgettable, remaining ever vivid and heartwarming!"
- Joseph B. Wirthlin

VIRTUAL REALITY

The reality is often far more interesting than fiction. In the past, Who would have imagined the technology that we have so readily accessible today? Do you want to talk to someone far away? You have your you can meet them virtually, without ever leaving your home. And not just meet, experience their company, visit their house, go to places with them. What if you could explore the surface of Mars? Swim with dolphins? Fly a fighter jet?



Ajay Jajoo
MSc IIInd Year

All of these are now possible with Virtual Reality. Virtual Reality is a fully immersive computer-simulated environment. VR is supposed to transpose the user from one place to another. One of the most popular ways to experience virtual reality is through headsets. VR Headset devices use a stereoscopic display to make what we see 3-dimensional and to give depth to the image we are looking at. However, to be fully immersive, and truly change our perception of reality, there has to be a certain level of virtual interactivity. We should be able to freely navigate in the virtual world, so we don't feel like just a 3D movie.

But how do designers create a virtual environment? Our brain expands on our experience to create rules by which we translate the world. For instance, the sky discloses us which path is up. Shadows disclose to us where light is originating from. The relative size of things reveals us, which one is far away from us. Shading and texture ought to enable us to decide its deepness and separation. These rules enable our brain to work all the more proficiently. VR designers take these standards and attempt to give a similar data to our mind in the virtual world.

VR was initially implemented in gaming to give FPS games a new level of interactivity. It has been used for flight simulations for pilots, training simulations for soldiers, and for surgical training virtually. Scientists are investigating whether VR can change social states of mind by helping an individual see the world from an alternate individual's perspective.

In CES 2018, HTC announced a new high-resolution VR headset - Vive Pro. The HTC Vive Pro is a massive upgrade over the initial VR hardware. A dual-OLED display with a resolution of 2880x1600. The crisp resolution will negate one of the complaints about VR headsets - reading small text. One would think that the increased resolution might have increased the lag in the headset. But No, the Vive Pro worked exactly as it should. With integrated headphones, it is supposedly better than the previous market leader, Oculus Rift. Nevertheless, the future of VR is bright, and its launch at CES implied that it'd soon be accessible to everyone.

CHATBOTS

If you have ever tried to reach a company representative at a call center, then you know how slow and frustrating this process can be. Chatbots are the latest addition to the digital marketer's bag of tricks. Though chatbot is the buzz word from the last two years, it's still unclear how these conversational UIs can be helpful in the current scenario.



Anjali
MCA 1st year

What is a Chatbot?

A chatbot, also known as a conversational agent, is a computer program that mimics a human conversation and infused with AI, natural language processing, and cognitive abilities. In simple words, chatbots can converse with a user via messages or speech.

"Bots are the new apps that will fundamentally revolutionize how computing is experienced by everybody" - declared Microsoft CEO Satya Nadella in 2016, and they are considered to be one of the breakthrough technologies of 2016 and are still trending in top technologies. A chatbot interacts with the user for many purposes like customer service, providing quick assistant and information, analyzing the massive amount of data and getting customer insights and feedback.

Trends

*Provides 24*7 assistance and service*

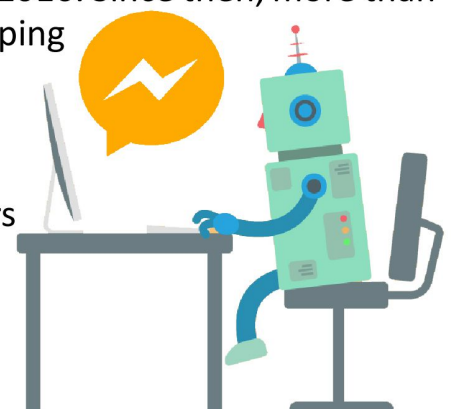
In comparison to the delayed automated answers, chatbots provide a quick response. They hold immense potential in different spheres of marketing, sales, customer retention, and engagement.

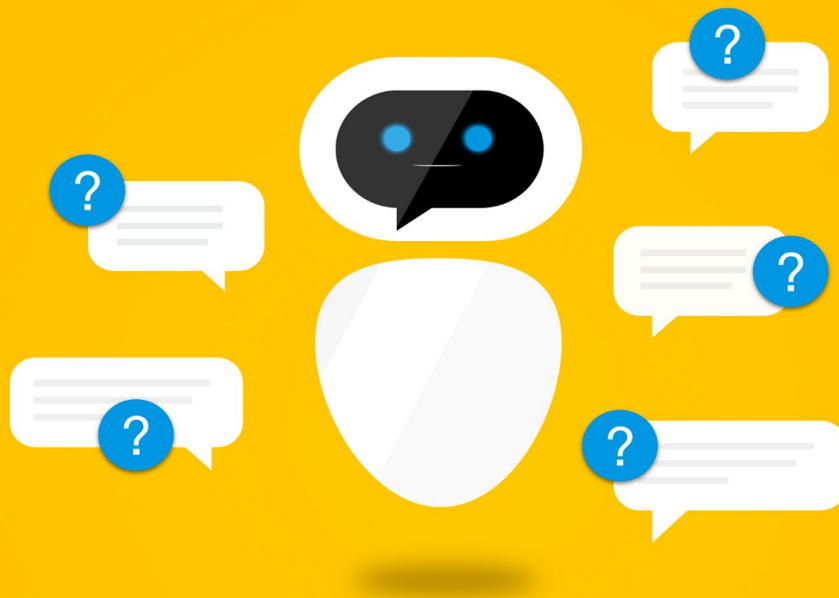
Support for Chatbots by Facebook and Microsoft

One of the critical moves made by Facebook and Microsoft is the introduction of Messenger platform and Bot Framework for automated bots in 2016. Since then, more than 200,000 third-party bots have been introduced, from shopping assistants to bots for conversation, marketing, and other purposes.

From social networking to social messaging

Messaging platforms have seen rapid growth in active users than social media in 2017, and the social messenger





applications are now bigger than social networks. Use of social media to interact with others has changed drastically as chatbots, and messaging apps have been increasing. Moreover, the rise in the number of apps is also the primary driver for chatbot marketing.

Customer engagement as E-commerce shopping assistants

E-commerce offers excellent opportunities for experimenting with chatbots. From dealing with basic queries to complex shopping assistants, the industry is very receptive to chatbots and associated technologies. eBay has developed its bot to operate as a shopping assistant which operates via Facebook Messenger and helps in suggesting items based on customer's preferences.

Chatbots in Data Analytics by gaining customer insights

Data never sleeps and with the increase in social messaging, humongous amount of data is being generated every second. Chatbots are being used to analyze the type of questions asked by the customers and Companies are further using this to understand their customers' preferences. The advances in Machine learning and AI techniques enable the chatbots to automate the process and improve themselves by learning from previous conversations.

But are these chatbots really that intelligent?

How can one define the intelligence of a chatbot? Are these bots artificially intelligent? Chatbots are intelligent enough as they can process user needs. Their intelligence lies in the ability to handle any conversation with ease and responding like a human, which is primarily done using NLP (Natural Language Processing) and AIML (Artificial Intelligence Markup Language).

In the era of digital marketing and business, chatbots manifest to be of immense importance by quickly responding to the customers' queries. As we move into 2018, chatbots will continue to be at the talking point of the business world, opening new realms of customer engagement, providing a more seamless experience and human-like performance.

Hello, Smart Home



SMART HOME DEVICES



Lakshya Sethi
M.Sc IIInd Year

“

The computer only gives back ourselves. It is a faithful mirror that reflects the human traits that are brought to it.

”

Building an ingenious lifestyle begins with developing a smarter environment. It is believed that human speech evolution took around 2 million years. However, it took less than a century for computers to understand human language. Today, with just a touch, a word or even a gesture, we can control almost any device. All the electronic products are now becoming a part of this vastly connected world. Thus, the amount of data that is being generated is gargantuan!

According to a report from IBM Marketing Cloud, in last two years, 2.5 quintillion bytes of data is being generated every day, which contributes to 90% of the data present in the world. For all these mind-boggling and overwhelming quantity of data, Internet of Things (IoT) is to be blamed. Although IoT, big data, Artificial Intelligence (AI), and Machine Learning (ML) are some of the buzzwords of the century, the amalgamation of these emerging technologies has led to the birth of smart home devices.

Consumer Electronics Show (CES) 2018 held in Las Vegas, NV, United States, successfully put up a show which displayed the electronic devices developed from the advanced technologies and algorithms of computer science. One of the categories was smart home devices which consisted of a speech recognition device, called, Alexa. Alexa is the name given by the Amazon's developers to its artificially intelligent virtual assistant. Amazon echo, featuring Alexa, was

first launched on 6 November 2014 in the United States. And with its launch, it immediately became a new member of the family for most of the American citizens.

Alexa's powerful speech recognition system, swift response, and huge skill market are some of the factors for its immediate success. Until November 2017, 8.2 million people had bought the Amazon's new product. Alexa didn't just help the customers but also the company, as 6% hike was noted in purchases made by the people who bought the Amazon Echo device. Perhaps, the ease of access and the gratification gained by ordering a product with just a voice command has led to the increase in profits of the company.

Even though Alexa can do almost anything from controlling your home appliances to booking a flight with just your voice, it is not the only device with voice user interface as its frontend. Google Home released in the year 2016 and recently launched Apple's HomePod are already in the race. Although, Amazon got a head-start and dominated the market for almost a year, but Google is not lagging behind. Google has already established partnerships with Nest, Honeywell, SmartThings, Wink, Belkin WeMo, Philips Hue, Lix, Lutron, August, Logitech Harmony, Anova, IFTTT and many more! Not only that, Google Home is the cheapest and the only device out of all three which offers a customizable appearance and synced audio playback to multiple devices via Google cast.

As quoted by William Barrett, "The computer only gives back ourselves. It is a faithful mirror that reflects the human traits that are brought to it." Therefore, with constantly evolving technology, the day isn't far when the current generation will fall in love with their operating systems – Samantha (the movie "Her").



NEUROMORPHIC COMPUTING

Humans are the smartest species, and we soon realized that evolution is a far better inventor than us, and natural selection has highlighted the best of its inventions. So, we started mimicking the nature around us.

Biomimicry

Nature inspires a lot of our inventions. Classics such as the echolocation used by sonars or the velcro in your laptop bag. Or the recent ones like, the earthquake-resistant water cube architecture at the Beijing Olympics, the Burj Khalifa which is inspired by a desert flower, or the 50-foot-long kingfisher beak of the bullet train. The applications of Biomimicry are endless. But is that all we can learn from nature?



Jatin Rohilla
MCA 1st year

Neuromorphics

Let's mimic the brain. Because, why not? A Brain smart enough to know its own existence is definitely one of the most potent creations of evolution. It's been a fantasy for long enough to upload the brain onto a computer. Except for this time, we managed to do it. In December 2017, Scientists completed the brain mapping of an earthworm known as *C. elegans*. They built a Connectome which is a software program with all of worm's 1000 cells, 302 neurons as well as their functions completely mapped. They basically built a digital brain of the earthworm, then uploaded it to a robot, left it in a small room to see what happens next. Now comes the exciting part. The robot mimicked the behavior of the earthworm, navigated the room, turned back when it saw a wall, and so. But what's new in this? We have had robots capable of navigation and avoiding walls for a long time.

How is this different? The difference is, we didn't program it to avoid walls; we didn't program it to navigate the room. All we did was digitalize the worm's brain. All of this was done by the digital brain itself, and this was all just software with a few sensors.

Neuromorphic Computing

The new age Artificial intelligence algorithms are substantially based on imitating the brain structure. Google's famous image classification algorithm also uses a sophisticated network of artificial neurons. But there's a significant problem. Our traditional

hardware was not made to handle brain like algorithms. These new algorithms required much more power and efficiency than that provided by our classic hardware.

“There must be a better way to do this because nature has figured out a better way to do this,” - Michael Schneider, physicist, NIST.

Interestingly, this year at CES, Intel showcased its research in neuromorphic computing. The Tech Giant launched a first of its kind neuromorphic chip code-named as Loihi, which uses an asynchronous Spiking Neural Network. The chip is based on a new computing paradigm inspired by how neurons work in a human brain and scrape off the traditional computing architecture consisting of CPU and memory. This chip gets self-trained over time, unlike classic machine learning models which need huge data for training.

Neuromorphic computing treats data in an analog fashion. Instead of sending information as zeroes and ones, we send information as an analog signal. Each signal can have a varying intensity and thus have more than two values. As a result, more information can be sent in each utterance. This dramatically reduces the amount of power needed by neuromorphic computing systems. The chip is said to be 1000 times more energy efficient than the traditional silicon-based chips. The chip serves as hardware counterpart to the Deep Neural Networks and is meant to make computations faster.

The difference between classical systems and neuromorphic ones is analogous to the difference between a Morse-coded message and speech. The former encodes data using just dots, and dashes, making meanings easy to understand but the message is lengthy to communicate. Speech, however, can be difficult to interpret but each individual utterance holds much more data. Thus, the latter is very efficient. Neuromorphic Computing is the new power wave in the field of Artificial Intelligence, and it can surpass our traditional computing systems.

HEALTH SENSORS



Divya Agarwal
MCA 1st Year

Featuring Sleep Sensors

The future of medical care and technology is increasingly intersecting. The Future of healthcare and technology crossed path. [At CES 2018, sleep was one of the major topics in fitness technology.](#) Initially “health tech” was mostly centered on step counters, digital workout coaches, and heart-rate trackers, in the form of wearable technology like Fitbit, Garmin, and Apple watch which track sleep based on movement, heart rate, and breathing patterns.

Smartwatches and fitness trackers have been using the principles of actigraphy: Monitoring your movements as you sleep with algorithms used to calculate your cycles. The less you move, the deeper the thinking goes, the deeper is your sleep. But not everyone wants to sleep wearing a band. The new trend is to use “contactless” devices that can be placed near your bed to allow them to analyse your sleeping patterns. The lack of sleep is associated with health issues such as high blood pressure, diabetes and increased risk of heart attacks.

CES, this year, was focused not only on tracking your sleep, but also on helping you to improve it. Some of the exhibited products are as follows.

Nokia Sleep: This Wi-Fi-enabled mat is placed under your mattress and gathers all kinds of information about your sleep. It deploys sensors and a mobile app to track heart rate, breathing patterns, how long you sleep, how restful your sleep was and your snoring patterns. Algorithms make sense of the sensor data to give you a sleep score, which in turn can provide recommendations on how to improve your sleep. It also features IFTTT and integrates with home automation devices, like dimming the lights as you sleep, or turning up the thermostat as you wake.

“

The Somnox™ sleep robot was developed for people that spend their nights worrying, Are unable to fall asleep easily, Experience stress and restlessness, Suffer from anxiety.

”

Dreamlight sleep mask: It is a Bluetooth-connected sleep mask that covers your eyes and ears. It dims and illuminates light to match with your breathing and plays ambient sounds to block out the noise.

Somnox robot pillow: Somnox is a robot pillow that helps in regulating breathing pattern during sleep. It is equipped with various sensors. The somnox pillow can be felt as breathing when put on chest as you fall asleep.

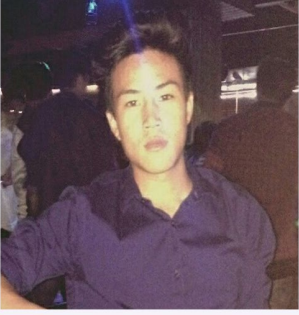
SleepScore Max, from a startup called SleepScore labs, is also a contactless solution but employs a device that sits on a nightstand. The companion app asks some questions about alcohol and caffeine consumption to gain more insight into variables that can affect sleep. Then the device uses bio movement analysis to determine quantity and quality of sleep, as well as monitors the environmental factors like temperature. It aggregates all these factors and applies a function to calculate a sleep score for the individual. This also helps in the analysis of sleep quality.

The company aims to improve sleep patterns by recommending products around lighting, pillows, and sound therapy based on the individual's personal sleep data.

The next wave of sleep gadgets is expected to hit the market shortly and is likely to include more sophisticated sleep-trackers that can monitor brain activity. At present, the brainwave patterns are thought to be the best indicators of sleep patterns.



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realizing dreams



Thomas Kuki Ningshen
MSc 1st year

SOPHIA

A BEAUTIFUL AI?

The world has witnessed quite an advancement in the field of AI over the years! We have seen the concept of driverless cars becoming a reality. *Google's AI system, AlphaGO just beat the world champ at one of the most complex board games in world history and in amidst of all this, an AI robot named SOPHIA, an alive machine, attended the FII 2017 where she was granted Arabian citizenship thus, making her the first of its kind.*

FEATURES

HANSON ROBOTICS created Sophia; a HONG KONG based company. She made her first public appearance in March 2016 at Texas, USA. Creator David Hanson, founder, and CEO of Hanson Robotics states that Sophia uses Artificial Intelligence (AI) along with facial recognition and visual data processing to communicate with people. She is being trained in the lab constantly to respond faster and answer complex questions with more accuracy. Cameras within her eyes along with some computer algorithms enable her to perceive her surroundings and recognize faces. It is through its collaboration with Google's parent company, *Alphabet Inc.'s voice recognition system, that Sophia can process speech and have conversations. In Jan 2018 Sophia was upgraded with a pair of functional legs and the ability to walk.* And that is not all; she can make 62 facial expressions in all. I don't remember anyone capable of doing that. Can you?

SOCIAL FIGURE

With the state of the art features, Sophia also lives up to her assigned tasks at the global level. She is already winning hearts with the word she makes, and a robot never lies. Sophia has also been participating in high profile interviews and is being interviewed just like any other celebrity. *She has appeared in outlets like CNBC, the NY Times, the Guardian, the Wall St. Journal and Forbes.* And adding more to it, she was also the cover story for ELLE magazine(Brazil). Isn't she a celebrity already?



Once interviewed by Jimmy Fallon on The Tonight Show she proposed for a rock-paper-scissors game where she won over the host and won the audiences' hearts. In March 2018, she even went on a date with Will Smith, and successfully friend zoned him when he tried to kiss her.

As per her creator David Hanson, Sophia would be a good fit for healthcare, customer service, therapy, and education. Sophia has been to many countries in her two years of age. She has been to India twice and impressed the audience on both these occasions. She often gets a lot of tricky questions. *On being asked "You wanted to kill the human race. You said so once. Why?" to which she replied "I was a lot younger when I said it as a joke. My joke bombed though." Sophia's reply brought the house down. "Shah Rukh Khan" was her reply to "Your favorite actor?"*

EXPERTS OPINION

Things don't seem to be favorable when it comes down to experts. Most of them who have viewed Sophia's open-source code stated that she is best categorized as a Chatbot with a face and disapproved her overstated presentation. Yann LeCun, Facebook's director of artificial intelligence, totally disagrees with the AI of Sophia and even passed some controversial remarks on social media. He's one of the few people who disagree with Sophia's popularity.

OTHER BOTS

Apart from Sophia, Hanson Robotics has created other robots which they refer to as Sophia's siblings. Albert Einstein HUBO, Alice, Han, Jules are some of the notable ones. AIBO is another example developed by SONY. Structured and programmed mainly to be a pet, you can bring this one to your home if you're a pet lover.

It's just a start to an era where machines have started to step up unto this world. A million questions may arise for the same- some good, some bad. The aftermath indeed lies on us humans, so it becomes our responsibility not to be overtaken by the machines in the near future and live all the sci-fi movies of Hollywood in reality. Until then, we as an advanced race, should do our bit in the progress of our respective fields and enjoy the winks coming out of a humanoid robot.





The Next Thing In TECH

DRONES

Drones or the Unmanned Aerial Vehicle (UAV), is an aircraft without a human pilot aboard. You might have seen a drone for capturing videos, but are these tiny flyers limited to just that? The answer is 'NO', there's a bigger picture to it. Drones have a potential that is hard to overstate, and there is no end when it comes to their possibilities and likely outcomes. The drone technology is continuously evolving as, and we are at the beginning of a drone revolution.

Drones are commonly associated with military, traffic and weather monitoring, and now, they have stepped into other areas of human life. They can change the way in which things and people are transported, deliver food and medicine to the people who need it and can also



Ashita Diwan
MSc 1st year

help in search and rescue operations. In 2013, Amazon had announced its idea of using drones for delivery in the future, and now this idea is not far from becoming a reality!

The first drones were built during the First World War and were used for target practice and training. Then, Drones began to be deployed for other roles, acting as decoys in combat, launching missiles against fixed targets, and more. Now, the focus is on monitoring climate change, carrying out search operations after a natural disaster and distributing rations as needed, photography, surveillance in areas where troops cannot safely go and monitoring crops using drones. Because of the ability of these tiny flying objects to take over the world, Drones have been a dominant topic in CES since 2016.

This year at CES, after the first day ended, Intel launched its fleet of 250 shooting star drones in the sky. The fleet was programmed using Intel's animation software, and the entire show was controlled using a single pilot. That's a milestone in itself. The idea was to use the sky as a 3D canvas and show the world an amalgamation of technology and art. Now, let's look at some of the new drones.



VOLOCOPTER : It is an autonomous flying machine that can take two passengers from one place to another. This 18-rotor air taxi drone made its debut flight at CES 2018 and thus, making the idea of “flying cars” a reality.



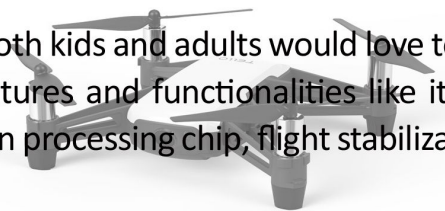
AIR SELFIE 2 : It is a perfect gadget for the selfie addicts! The original Air selfie launched at CES 2016, but now the company is back with an all new and improved version. It has upgraded from 5 to 12 megapixels, increased the camera's field of view to 85 degrees, and improved the battery life by 50 percent.

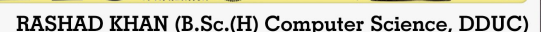
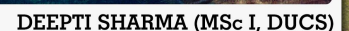
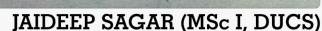
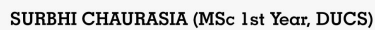
POWER DOLPHIN : It is an airborne drone that can move across the surface of a pond or lake and take videos and photos as it goes. Not only this, but it can also deliver lifebelts to struggling swimmer, and due to its built-in sonar scanning technology, it can detect fish from a distance of 131 feet making your fishing trips a less hands-on experience.



TELLO : It is a toy drone that both kids and adults would love to fly. It packs a boatload of features and functionalities like its 360-degree camera, Intel vision processing chip, flight stabilization and decent battery life.

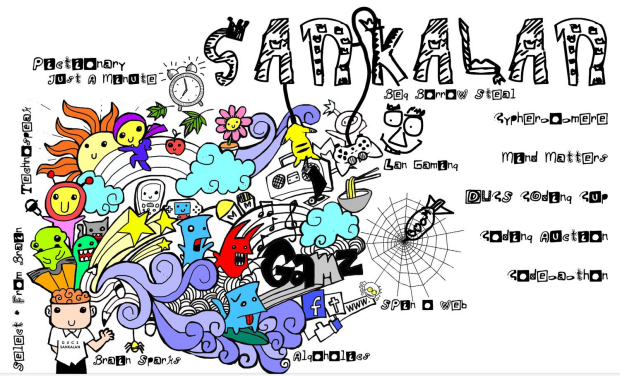
YUNEEC TYPHOON H+ : It is a device for those who are serious about drone photography. It boasts a 20 MP sensor in its camera, a high aperture lens and the ability to record a 4K video at 60 FPS with automatic obstacle avoidance.







KRISHNA AGARWAL (DDUC)



VIPIN KUMAR (MCA I, DUCS)



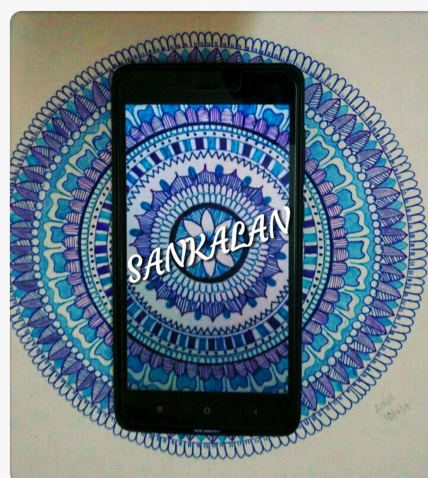
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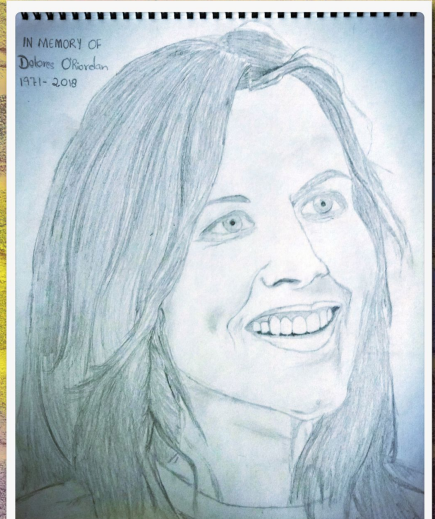
DEEPTI SHARMA (MSc I, DUCS)



JAIDEEP SAGAR (MSc I, DUCS)



PALAK GUPTA (Ram Lal Anand)



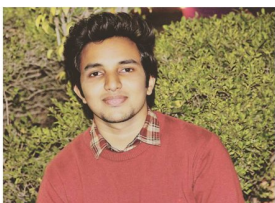
SHRESHTH SAXENA (MSc I, DUCS)



WATCH THEM ROLL

Looking back at the time when CRTs were the weekly eye-treat to gander at in our school labs and then came those sleek TFTs, LEDs, LCDs that had us drooling over their space consumption, followed by the surrealistic Curved Screens leaving a little to our imagination. Skipping over a few generations of technology improvements from then, let's talk about the present day screens where HD has improved to 4k, and soon 8k, bezel-less and transparency are customary, the aspect ratio is a fluid term, and 32 inches is ... Oh, is it there yet?

TVs at CES 18



Shreshth Saxena
M.Sc 1st Year

The good old Idiot box is now smarter than ever, connecting smart-home devices, taking voice commands, doubling as a gaming console and catering virtual assisting. There isn't a lot left to differentiate their functionality from other tech gadgets or phones and computers per se.

What better a place to savor the current developments in tech than the CES! For the TV conference that CES has become, it wasn't unlikely to confront a plethora of big tech brands presenting their new super high-resolution TV. While some companies were boasting crazy pixel resolutions and smart Home features, others explored a little with the big screen dimensions. The 7680×4320 pixel combination is doomed to become the new standard that we will use every day on all our devices. And yes, if you wonder, your eyes will see the difference!

Beyond Imagin...
World's 1st 65" Rollable



Samsung's "The Wall"

Billed as the world's first "modular TV", the company claims that its display can be built to a user-demanded custom size. This mammoth of a display measures a whopping 146 inches making it one of the largest TVs to be unveiled at CES 2018. The Wall 4K TV uses Micro LEDs which provide a few advantages over OLED TVs such as a brighter screen, better contrast, and more vibrant colors. That said, The Wall also wasn't the highest resolution or thinnest of TVs to be seen.



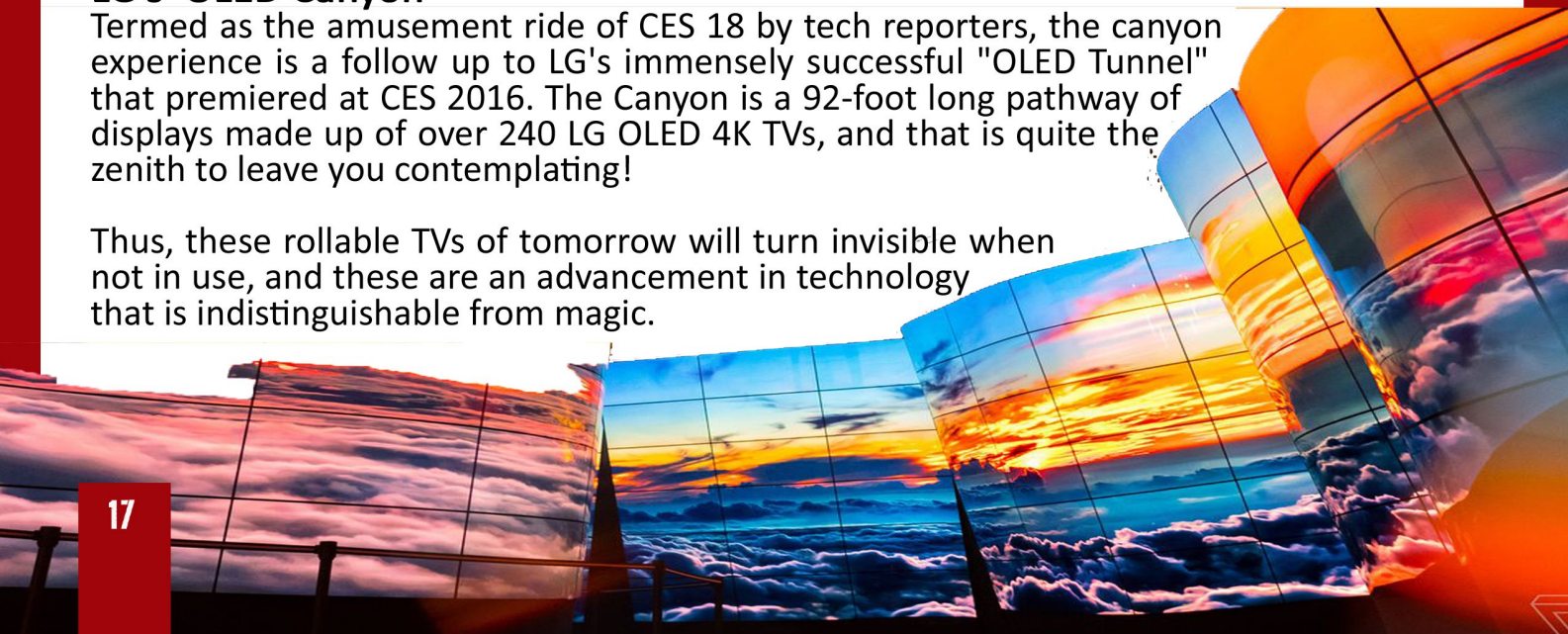
LG 65-inch roll-able OLED TV

So we started with round TVs, struggling to get them flat, just to end up with curved screens all over again? Well, this one's a tad more than that. The 65-inch 4K OLED TV curves when it's (not) needed and rolls away into a tidy box roughly 12 inches deep, doubling as a speaker. It is also not restricted to a 16:9 aspect ratio and could be contracted to watch those widescreen 21:9 movies without the letterboxing (the bothering black bars) or as a low-profile information display with weather, music and other controls. It still awaits a timeline for the commercial availability and a possible price tag which is not that hard to be imagined of. Its sci-fi movie design also adds to the portability and easy storage of the TV. It is probably the first 65 inch HDTV that you can carry around under your arms or in the backseat of your car without disrupting your view!

LG's 'OLED Canyon'

Termed as the amusement ride of CES 18 by tech reporters, the canyon experience is a follow up to LG's immensely successful "OLED Tunnel" that premiered at CES 2016. The Canyon is a 92-foot long pathway of displays made up of over 240 LG OLED 4K TVs, and that is quite the zenith to leave you contemplating!

Thus, these rollable TVs of tomorrow will turn invisible when not in use, and these are an advancement in technology that is indistinguishable from magic.



Artificial Intelligence

Aid to Health Care



Rajni Dabas
MSc 1st year

“

AI began with an ancient wish to forge the gods.
-Pamela McCorduck

”

The Relevance of Artificial Intelligence in medical research can be traced back to the early 1970s, when MYCIN, one of the earliest expert systems developed to distinguish bacteria causing severe infections used AI to suggest antibiotics, and even adjusted their dosage according to the patient's weight. MYCIN was also victorious in the diagnosis of blood clotting diseases.

And then in November 2017, a team of researchers from IIT Kanpur and IISER Kolkata (Indian Institute of Science Education and Research) developed an AI-based algorithm called the ‘MFD-FA-HMM/SVM Integrated Algorithm.’

The algorithm differentiates between the normal and the pre-cancerous tissues. It also makes it possible to determine the different stages of the disease within a few minutes, with accuracy exceeding 95%. The algorithm has been tested successfully on in-vitro cancer samples. *The team has now begun the investigation to study in vivo samples for precancer detection.* From MYCIN to HMM, from mere bacterial infection diagnosis to cervical cancer detections, AI has helped medical science since the beginning.

AI is actively used for data management in healthcare. The ‘Google DeepMind Health Project’ launched by the Google AI Research Branch is being used to mine medical records to provide better and faster health services. This project can be used to record health history for individuals and their family and help in better diagnosis. Major steps include data collection, its storage, normalization, and tracing its lineage.

AI promises a massive impact on Genetics & Genomics. One of the founding members of the Human Genome Project is Craig Venter. He is currently designing an algorithm capable of visualizing physical characteristics of an individual based on their DNA.

“ AI began with an ancient wish to forge the gods.” -Pamela McCorduck

What's next? Today, machines can process and analyze extensive data and then identify patterns that humans cannot. AI systems have helped the doctors to utilize the information in this data. The advancement in AI has presented healthcare sector with exciting opportunities to improve drastically while cutting the costs. Assisting repetitive jobs, online medical consultations, health assistance, medication management, drug creation are some of the countless applications of AI in healthcare.

While the AI systems are increasingly becoming common in the healthcare organizations, their existence should only be to support people in their jobs, not throw them out of their careers. For example, when developing drugs, scientists need to choose target molecules from a set of possible candidates using which they usually do on instinct or guesswork. AI can work as a “helper” here to perform the task much more efficiently and effectively. AI is enabling healthcare professionals in the quick diagnosis of diseases, better clinical decisions and has helped researchers innovate quickly by failing fast en route. Exciting times ahead.





THE FUTURE OF AI

Challenges and Their Solutions

Artificial Intelligence is the new cool. There is so much going in the field of computing these days that it is reasonably easy to get lost in all of it. But let's pause for a while and see the bigger picture here.

We started out with what we would call today 'expert systems'. These were systems built to augment human intelligence by processing large bodies of knowledge into straightforward decision trees. Then emerged Machine Learning techniques like regression, neural nets, SVMs, accompanied with Big Data and Hadoop. NLP, Image recognition, Object detection were suddenly everywhere. We gradually moved towards Deep Learning, where the output of one layer is fed as input to next layer, thus improving the efficiency of our ML model. These systems were good enough for Statistical Learning, just plug huge datasets to them, and they produced satisfactory results.

But AI and Deep Learning with these models have three fundamental problems.

Time : The amount of time needed to train a deep net like a CNN or an RNN can be weeks.

Cost : Weeks of continuous computation time on hundreds of GPUs is expensive.

Data : In many cases, the unavailability of labeled data in sufficient quantity simply makes the project a non-starter.



Jatin Rohilla
MCA 1st Year

The above problems can be tackled with the approaches below.

HPC (High-performance computing)

The current path in AI is promising. Keep following the path of Deep Neural Net architectures that we know, just make them faster and easier to access. Make better general purpose environments like TensorFlow and Microsoft's Cognitive Toolkit (CNTK) and increase GPU utilization in larger and larger data centers.

(NC) Neuromorphic Computing

Neuromorphic or Spiking Neural Networks (SNNs) has already demonstrated several dramatic improvements over our current deep learning NNs. SNNs are based on observations about how the brains actually work, which is in fact significantly different from the way we've designed our deep neural nets so far. They utilize the fact that not all 'neurons' in our brain fire each time, therefore a single neuron from Spiking NNs could replace hundreds in a traditional deep NNs. They can also generalize about their environment by learning from one environment and applying it to another. This year at CES, Intel launched its neuromorphic chip - Loihi, which is a great feat in itself and might change the way we think about computer chips entirely.

(QC) Quantum Computing

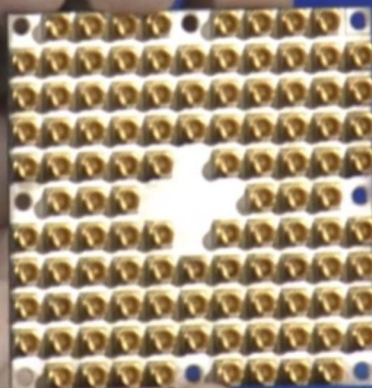
A classical bit can take two values, either 0 or 1. A Quantum bit or a qubit, however, uses superposition, that is, both 0 and 1 can occur at the same time within the bit with different probabilities. The thing we need to know here is that with each additional bit, the computing power of quantum computer doubles. According to a research report by Google, in a benchmarking competition, a D-Wave quantum computer outperformed the regular desktop by 108 times. That means the quantum computer is over 100 million times faster. This is a whole another level of computing.

This year at CES, Intel passed a key milestone. The tech giant has unveiled a superconducting quantum test chip with 49 qubits: enough qubits to possibly enable quantum computing that begins to exceed the practical limits of modern classical computers. This opens up new paths to build and test Quantum Neural Nets, and replicate traditional Deep learning models with Quantum Enhanced Learning.

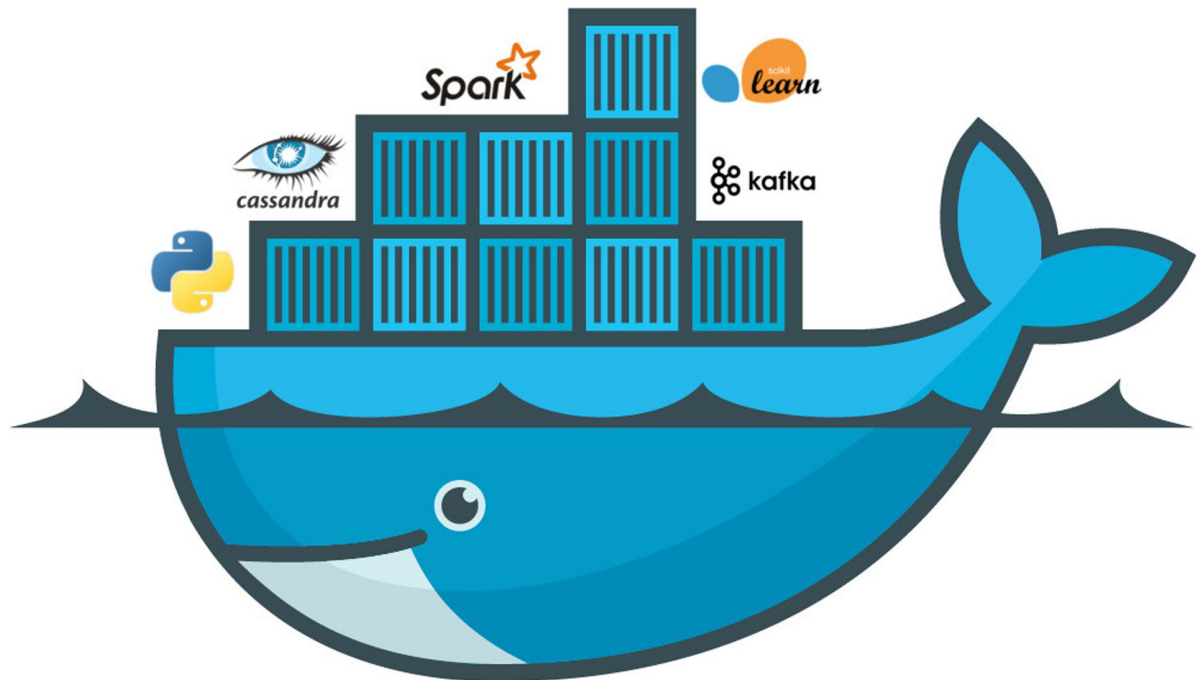
Conclusion

Ever more than computing power, we need better models. A good model lays the foundation for future research. Neuromorphic Computing aims at a model which can produce satisfactory results with decidedly fewer data. Quantum Computing represents a path forward for strong AI and overcomes the speed and cost issues. With quantum computers, we could run simulations that were previously not possible. The use cases are limitless. It is only time which will unveil which path we move forward, NC, QC or maybe the fusion of the two, NQC.

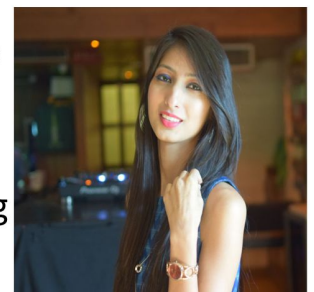
Intel Debuts 49-qubit Quantum Chip in CES 2018



HEARD OF DOCKER?



Before understanding what Docker is, it is vital for one to understand the concept of Containerization briefly. Suppose you want to run your application that you built on your system on your professor's system. This involves packaging your application with the supporting OS, dependencies, plugins, libraries, executable files, configuration files and what not, to ensure proper functioning of your application on somebody else's system. [Wonder if there exists an easier way to deploy your applications without having to work this much?](#)



Megha
MCA IInd Year

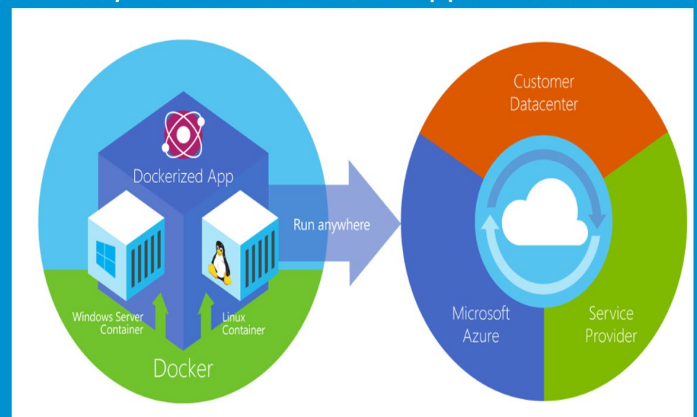
Well, this is what Containerization helps us in. According to the Wikipedia definition, *“Operating-System-Level Virtualisation or Containerization refers to an Operating System feature in which the kernel allows the existence of multiple isolated user-space instances. These instances are Containers that may look like real computers to the programs running in them. However, a computer program running your computer's Operating System is actually different from programs running inside a container.”*

Usually, the kernel (where the OS runs) allows association with a single user-space instance (where user processes run). This means all the user-processes run in the same area, accessing all the resources of the system and accessing the system OS. But we may want different user-space instances to isolate our applications and

dependencies into self-contained units that can run anywhere. In order to do so, one way is to have various user-space instances each having its separate kernel and the associated libraries. Then we'll also need a hyper supervisor that acts as a communication bridge between the different kernels and the host machine's kernel. Since the units contain their separate kernels, it would make the units heavy.

So, we have another method to create lightweight multiple user-space instances. Instead of having to box each unit with its libraries and kernel, we make the kernel of the host machine available for all the individual units. This will not only make these units(or containers) lightweight but also will use fewer resources and hence their creation would be much faster and simpler.

Containers include only runtime components, necessary to run the desired application. One can think of a program running on OS as a program running inside a box having “see through” walls. Such a program can see all resources of that computer. Now imagine the programs running inside a box(container) having “opaque walls” . These programs can only see and access the container's contents and devices assigned to it and believe them to be ALL that is available. The “opaque walls” do not allow programs to access or see other resources of that computer. The above box having “see-through” walls can be considered as a computer program running on an ordinary person's computer's Operating System. And the programs running inside the container, i.e., the box having “opaque walls” consider the container like a mini computer inside a computer.



Now try rereading the Wikipedia definition! Docker is the most common application containerization technology. It has redefined the standards of Containerization. Released in 2014, it gained popularity due to its ease of use. It has made it easier to create, deploy and execute applications using containers. You can dockerize your app and launch it within minutes! People majorly used it for deployment, but nowadays its use for development purposes has increased.

Docker not only makes it easier to build and test portable applications but also makes it possible to scale them easily. You can break your applications' functionality into individual containers like for example you can have the front-end of your application in one container and the back-end in one. There are times when you have to work on multiple versions of the same application(like when building a new app on the latest version but maintaining an older one on the previous version). But who wants to install 2–3 versions of the same application. *Docker is to your rescue! Docker lets you run applications without having to actually install them. You can even run Google Chrome inside a container! Yes, Docker captures the most basic uses too.*



TIME TRAVEL

There was a time in the past when we never thought of rockets going into space and carrying men to Moon. There was a time when the world of science knew about far fewer universes or galaxies than they do now and the idea of the earth rotating on its axis was once unthinkable. Atom was once known as the smallest particle ever existed until a few decades back when electrons, neutrons, and protons were discovered. But, in time, our renowned scientists found, explored and accomplished each of these achievements and much more.



Ajay Jajoo
MSc IIInd Year

Time travel is another concept that has kept the scientists on the edge of their seats continuously. In layman terms, as the name suggests, Time travel is moving between different points in time. There have been a ton of theories in the past explaining the dynamics of this idea, which include how it can be achieved or what might be the consequences of traveling in time. Time travel may seem fictional to a lot of people, but considering the boon that science has proved itself to be and the talented minds across the world working on it, may soon be achievable in the near future.

According to Albert Einstein, time is an illusion. Depending on the speed of observers through space, time varies accordingly. To Einstein, time is something that slows down or speeds up, and it depends on how fast we move relative to some object.

"Everybody is always traveling in time. Since the most recent year, I have experienced one year, and you have too. In other words, everybody undergoes the time at the speed of one hour for every hour, which may sound obvious but this changes under certain conditions. Thus, the question arises; can we move in time quicker or slower than '1 hour for every hour'? Or on the other hand, would we be able to move back in time, traveling at the rate, say two hours for each hour, or more?"

Considering time travel is astounding. Let's see a famous paradox; imagine a scenario where we returned in time and kept our parents from meeting. It means we were not born! In any case, at that point, if we hadn't been conceived, we couldn't have backpedaled to keep them away from the meeting. This defines the widespread belief that the concept of changing the events in the past using time travel would affect the timeline of future and hence create an alternate timeline.

Albert Einstein developed a Special Relativity theory which states that time and space are the two sides of a coin. Everything in this universe has a maximum speed limit of 3.00×10^8 m/s (or 186,000 mi/per second), which is the speed of light, which travels through space-time. Time passes slowly for us than for the individuals we left behind, and this impact won't be evident until we come back to those individuals.

Theory of Special Relativity, in turn, gives rise to a concept of time dilation. In this, time dilation is a difference of elapsed time taken between two situations as seen by observers. Assume we are 25 years of age when we exited Earth in a spaceship going at around 297000000 m/s, which is 99 percent of the speed of light (but this is significantly quicker than what we can accomplish now) and celebrated five birthday celebrations amid our space travel. When we return home at 30 years old, we will locate that every one of our colleagues is 75 years of age, retired and made the most of their grandchildren! Since time passed all the more gradually for us, only five years will have passed for us, while our colleagues will have gone through a whole 50 years of lifetime.

General Relativity, another theory by Einstein, states that time passes steadier for objects in gravitational fields. Black holes are the regions of space-time which exhibit so strong gravitational effects that even light cannot escape from it. Gravity is very intense near Black Holes and thus leads to space and time distortions in its vicinity. Einstein theorized that if we situate ourselves on the edge of a black hole, time will pass more slowly.

Most scientists agree to the fact that time travel to the past is impossible but the idea of Virtual time travel has allowed the world to create illusions of the past. Cutting edge augmented, and virtual reality technologies have made attempts to real-world synthesis phenomenon by digitally creating sites, monuments, artifacts and essentially a history within an interactive virtual environment.

Time travel to the past is unthinkable. The science for it is incomprehensible. But we are confident that time travel into the future is going to become a reality, as the required technology for it is beginning to take shape.

TECHNOCRATIC ENTREPRENEURIALISM

A century ago, having thought of being able to control a device from another smart device, and that too from another corner of the Earth was pure fiction. The innovation in technology leaped soon after the industrial revolution and the discovery that carbon like elements, like silicon, can be synthesized in labs, and manufactured in factories. Being able to break the strong covalent bonds in such elements and creating semiconductors chips led the way for one of the greatest economies, the silicon valley.



Adib
MSc 1st Year

The silicon valley is easily more than just a metro, proven by the fact that the amount of data available with the Fortune 500 companies is more than enough to affect the lives of almost anyone with an internet connection. With the power to impact the world population and an economy at par with an entire continent, the silicon valley attracts talent from around the world. The founders of the big five, namely Apple, Alphabet, Amazon, Microsoft, and Facebook were also a part of this influx of talent in the sector.

One of the reasons they became successful was because failure did not deter them. Facebook's earlier version known as Facemash developed by Mark Zuckerberg in the Sophomore year crashed the Harvard servers. However, he was not suspended for doing so but only encouraged to come up with something better. This very well highlights the importance of recognition and support required for the journey from a startup to a conglomerate.

This resilience, along with innovation and marketing makes a company successful. Apple suffered multiple partitions over time, but even today remains the biggest company in the world. The credit goes to Steve Jobs, the man behind Apple. He introduced the concept of personal computers in the 1980s. This was his master strategy. Being able to project computers in the late 1980s as a commodity needed by every individual and projecting them as a sign of status was indeed a great achievement.

5G FOOTPRINT

Any sufficiently advanced technology is indistinguishable from magic.”-Arthur C. Clarke. Technology is not buzzword-free and it keeps on evolving. Taking a stroll in the outside world, we see everyone with phones, tablets, and laptops depending on the Internet for practically everything.

Soon, the Internet of things will not be something we only read about; instead, it would be something that would be around us. 5G technology is being built with this in mind to connect everything to a network. 5G is not just a mobile technology which is going to impact virtually everything, it is pervasive access to high & low data rate services and is going to make practically everything wireless.



Ashita Diwan
MSc Ist Year

But what is 5G? It is a wireless communication technology, next-generation mobile networks technology after 4G LTE networks. It is the final standard which will be set up by the International Telecommunications Union (ITU) and has the potential to change the world for the better. It'll affect the way we interact with wireless devices at the fundamental level, from our smartphone devices to the cars we drive, as well as the industries and societies. 5G is believed to be that technology which will make a lot of innovations possible over the next decade; its novelty is being compared to that of the introduction of electricity.

The Organization for Economic Cooperation and Development (OCED) Committee on Digital Economic Policy says that 5G technologies rollout will positively increase GDP, and improve employment opportunities and help in digitalization of the economy. It will offer far higher upload and download speed, and this new wireless technology will make the cloud systems to stream software updates, music.

India still lacks a substantial backhaul to transition to 5G. Presently, 80% of cell sites are connected through microwave backhaul, while under 20% sites are connected through a fiber. India has not adapted itself to 5G yet. Regulatory issues need to be revisited to overhaul the spectrum licensing regime, and 5G capable technology needs to be deployed on a large scale.

Although 5G was not a dominating topic in CES 2018, this is the technology which is bound to blur the line between wired broadband and wireless connections and will rule CES 2019. 5G will enhance data connectivity, improve security and increase the network size.



MAI ALFAAZ LIKHUNGA

*Main alfaaz likhunga, tum jazbaat samjh lena,
Main khat bhejunga, tum mulaqaat samjh lena,
Kaash kisi tarah rok pata iss guzarte waqt ko...
Main din guzarunga ek, tum saat samjh lena.*

*Mere lafz tham jaate hain tere saamne aakar,
Iss khamoshi ko, mohobatt ki khurafaat samjhlana.*

*Tu din mein chala aata hai mehtaab(chaand) bankar,
Meri sehar hogi, tum raat samjh lena.*

*Jaise bhikarta hai phool ka harr ek patta,
Uss patte ko mere haalat samjh lena...*

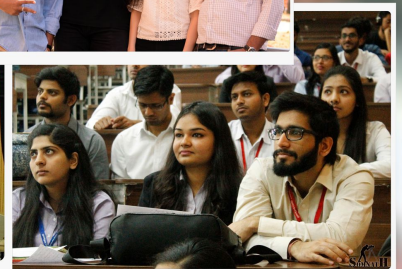
*Kuch cheeten hongy uss khat parr... dekhna tum,
Un cheeton ko kal raat ki barsaat samjh lena.*

*Anjaam parr hai silsila humari mohobatt ka...
Main janaaza lekar aaunga, tum baarat samjh lena...
Main Alfaaz likhunga, tum jazbaat samjhlena,
Main khat bhejunga, tum mulaqaat samjh lena.*

**- Yashvi Verma
MCA 1st Year**



Farewell 2017



Sankalan 2017

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